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PSYCHOLOGICAL ASPECTS OF ACCIDENT PREVENTION

BY

H. J. SLOMAN

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PSYCHOLOGICAL ASPECTS OF ACCIDENT PREVENTION[1]

By H. J. Sloman[2]

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INTRODUCTION

Industry, including coal mining, has come to realize that to prevent accidents the human element must be given more consideration than was customary in the past. In formulating safety rules and regulations and in the enactment of laws governing mining, too often enforcement is emphasized rather than the means of gaining willing compliance. The purpose of this paper is to call attention to the human side of accident prevention, and the approach to this important and much-discussed subject will deviate somewhat from the usual discussions.

The human being is a complex mechanism, both physically and mentally. It is difficult to establish a common denominator for the actions of humans, except in general. In establishing mining laws, rules, regulations, and standards, the ultimate objective should be to gain the best possible response of workmen, so that optimum results in accident prevention may be obtained. The complexity of human beings is apparent when the many ways in which they differ are considered. Some of these differences are manifested in emotional and phlegmatic types, degrees of intellect or native intelligence, and in hopes, desires, aspirations, and philosophies of life. How much simpler accident prevention would be if the response to laws, rules, regulations, or standards were equivalent to the definite movements of puppets responding to pulls on strings. Each time the strings are pulled in exactly the same way, the puppets will respond in exactly the same manner. Human beings, although having many similar characteristics, do not respond uniformly to identical "string-pulling"; therefore, much study is necessary before the desired responses can be obtained. To achieve the ultimate in accident prevention, it must be "worked at" constantly. Regardless of the adequacy of safety laws, rules, regulations, or standards, good accident records will not "roll in" if due consideration is not given to the personal traits of those most likely to be involved in accidents.

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[2] Mining engineer, Health and Safety Division, Bureau of Mines, Washington, D. C.

In using the term "psychological aspects," one must be careful not to give erroneous impressions. Often the word "psychology" is used rather loosely, and, therefore, it may be well to define it. The following definition is taken from Webster's Unabridged Dictionary, and, as is often the case, the definition becomes so involved that the final effect may be confusion rather than clarification. Therefore, it is well not to be disturbed by the definition and term it "college-professor stuff," because, so far as application to this paper is concerned, it can be clarified easily.

> Psychology - The science which treats of the mind (of man or other organisms) in any of its aspects; systematic knowledge and investigation of the phenomena of consciousness and behavior; the study of the organism and its activities, considering it as an individual whole, especially in relation to its physical and social environment; also any school or system of this science * * *.
>
> In most of its early manifestations psychology was a branch of metaphysics, dealing with the concept of the soul. In subsequent early development it consisted chiefly of a doctrine of mental faculties or powers, as of perception, memory, reason, and will, deductively elaborated. In the seventeenth century, the deductive method of rational psychology began to be supplemented with observations of experience * * *. Differences of approach and method have given rise to schools often differing widely, as in stressing predominantly feeling and desire, intelligence or objective, especially motor responses.

It is not the purpose of this paper to delve into the various psychological schools of thought in an attempt to correlate them where they seem to agree, its purpose is to point out how the general principles of psychology may be applied constructively to the prevention of accidents. An attempt will be made to give, in simple language with commonplace illustrations, the psychological aspects of accident prevention.

PSYCHOLOGICAL PROCESSES

Referring to the definition of psychology, it was originally the study of the human soul, an abstract subject; later it became a study of the human mind, and finally a study of human consciousness and behavior. Psychology is considered to be a branch of biology because it deals with mental processes largely affected by biological influences; it is the study of human nature - why people think and act the way they do, to use a slang expression - "what makes people tick." The discussion that follows will be concerned with normal persons and will not deal with the study of the lunatic fringe - abnormal psychology.

Basically, in studying human nature or human behavior we know that certain situations, visual or mental, bring about certain reactions in human beings. Such reactions may result in physical movement, mental pictures, or emotions. This is called a stimulus-response condition; we humans are subject to it continuously in daily life, but we do not respond uniformly to the same situations (stimuli). If by educational methods we can have people respond properly to certain stimuli (situations), we have brought under control the stimulus-response principle, and such methods are especially valuable in accident prevention.

HUMAN TRAITS

Some disagreement exists among psychologists as to whether humans exhibit instincts or traits at birth. An example of an instinct is exhibited by certain types of moths, the female of which will deposit eggs and some food in a sand mound and then leave the locality. The eggs hatch, and the larvae eat the food and develop into caterpillars. Eventually the caterpillars spin cocoons and finally emerge as moths. During the transformation from larva to moth, the insect has no training from its mother; in fact, it does not even know its mother, and therefore, its actions are inherent traits.

Whether or not we agree that human beings have instincts, we do know that they have emotions. One of the innate or fundamental emotions is fear. Hold a new-born infant in your arms and make a quick movement as if to drop it; the infant will make a clutching movement with its hands to hold on and probably will cry. The infant needs no specific training in this emotion, and during its growth from childhood to maturity the emotion of fear is never lost. Advantage is taken of the emotion of fear in accident-prevention training by explaining that if certain practices are not followed the individual may get hurt or lose his life; but the appeal to this emotion alone will not always guarantee success for an accident-prevention program. Fear is played on constantly in certain types of advertising, both radio and printed. We hear that if we do not take a certain kind of laxative "after 35," dire consequences may result. If we do not use a certain soap we may offend other people by body odors; or by not using a certain mouth-wash, we may offend with bad breath. Apparently a large proportion of our population is "afraid," because the sale of these products is enormous.

The human being manifests very little intelligence at birth, but he is born with a native intelligence that can be developed by proper environment and training. Were human infants left to their own devices, as is the moth larva previously described, it is probable that the human race would have perished centuries ago because of its helplessness in infancy. The normal human being has a considerable capacity for learning, which continues throughout childhood and adulthood until senility sets in; therefore, education in accident prevention is possible throughout the span of productive years.

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Other emotions are either acquired or developed by humans. An infant is usually 2 months or more old before he smiles or laughs. This emotion of pleasure may be learned from older humans or it may be a dormant (undeveloped) emotion at birth. Other emotions are developed as the human being matures, and they are manifested when certain stimuli (situations) are present.

The radio will serve to give examples of stimulating emotions of love and vanity. A certain popular program for the sale of hand lotion appeals to the vanity and romantic emotions of women by inferring that the use of this hand lotion will bring them beauty and romance. The ultimate desire of the advertiser is to have his listeners rush out and buy a bottle of this particular lotion, and the success of this kind of advertising is attested by the length of time this program has been "on the air."

CONDITIONED STIMULUS RESPONSE

The foregoing are examples of how advertisers make use of the conditioned stimulus-response principle. A situation is created through the sense of hearing or vision, and the response or reaction is developed because of the stimulus. One of the foremost examples in psychological annals of conditioned stimulus response is the experiment of Pavlov, the eminent Russian psychologist, with his dog. The experiment was, briefly, as follows: For a number of days Pavlov would ring a bell, then he would show his dog a piece of meat. The dog's mouth would water, and Pavlov would give the dog the meat. After a time, Pavlov would just ring the bell; the dog would come running and his mouth would water even though Pavlov showed him no meat. The sound of the bell had conditioned the dog to think of meat, and his desire for the meat was manifested by his mouth watering.

SAFETY CONSCIOUSNESS

According to part of the definition of psychology at the beginning of this paper, the study includes a knowledge of the phenomenon of consciousness. Consciousness may be defined as a mental awareness of a situation (stimulus). Carrying this to the field of safety and accident prevention, the term "safety consciousness" is used to denote an awareness of danger and a desire to do something about it.

The highest degree of safety consciousness is developed when a situation elicits the proper response promptly with little or no mental or physical effort and without variation.

Examples of safety consciousness and the proper response to the stimulus for coal-mine situations are as follows:

1. A motorman leaves his locomotive cab to replenish the sand supply or for any other reason. He turns his controller handle to the off position, places the reversing lever in neutral position, sets the brakes securely, and removes the pole from the trolley wire.

2. A miner, upon arrival at his working place at the beginning of the shift, looks for the fire boss' mark, tests the roof, and sets safety posts

or such other timber as necessary. He tests the roof frequently during the shift. When any other person visits his place, he stops whatever he is doing and tests the roof. When a mine car is brought to his place, he sets brakes or sprags and otherwise blocks the car to prevent accidental movement.

3. A brakeman always attaches a trip light to the rear end of a trip. He does not jump off moving trips to run ahead to throw switches or open doors. He does not couple cars that are in motion, especially from the inside of a curve, and he always wears snug-fitting clothing.

The foregoing are examples of safety consciousness which, if developed to the highest degree, becomes a compelling force. The stimulus of each situation should bring forth the safe response to such an extent that it becomes as automatic as the bell that caused Pavlov's dog to water at the mouth even though he saw no meat.

HABITS

Human beings are creatures of habit, and once a habit is learned it is overcome only with difficulty. An old adage says "it's hard to teach an old dog new tricks;" what is really meant is that habits are difficult to change. Many of us engage in quite harmless habits that are difficult to change. Most of us, upon rising in the morning, take a while to emerge from a sleepy condition, and the physical motions we go through become largely automatic with little thought and through the "force of habit." Each habit shows an almost automatic procedure that is followed day after day without apparent thought. If, however, one attempts to vary the procedure, a relatively simple act may become difficult; hence a habit, even a simple one, usually is hard to break.

BAD HABITS

Bad habits, such as unsafe practices, are fully as difficult to change as the harmless habits mentioned. The difficulty in overcoming is, first, that the old bad habit must be "unlearned" and, second, that a new good habit must be learned to take the place of the old bad habit. Repair shops at some coal mines are notorious examples of poor housekeeping. A poorly maintained repair shop is one in which, upon entering, a person is confronted with various machine parts, tools, nuts, bolts, washers, chains, etc., strewn about a dirty, oily floor and on work benches. Probably attention is drawn to a partly dismantled mining machine or locomotive from under which a mechanic emerges in coveralls so grease- or oil-soaked that if he came near a source of ignition he would become a human torch. Such shops usually have a grinding wheel and no goggles or eyeshield available. Other machines in the shop, such as a lathe, drill press, shear, and power hack saw, quite often are belt-driven from line-shafting without guards for the belts. Ask the mechanic to find a nut, bolt, rivet, tap, or die of a particular size and then watch the procedure in finding what is wanted. In such a shop it is not only difficult to do good work, but the probability is that the repair work itself is done in a slipshod manner. Repairs are usually made as quickly as possible to return a machine to the mine. The whole atmosphere is not conducive to

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good workmanship. As to habits, in attempting to get one of these shops cleaned up the work will be put off as long as possible, and even if the shop is cleaned and placed in an orderly condition it will be very difficult to keep it so until a new habit is formed. The condition of some mine shops is not exaggerated in this example, and it has been found to be a very difficult task to convert bad to good housekeeping.

A safety-conscious mine organization does not permit the bad habit of poor housekeeping to develop partly because of the known difficulty of replacing the bad habit with a good habit. Poor housekeeping is bad practice and is very likely to cause shop accidents; even worse than this are the commonly slipshod, makeshift repairs on machines sent into a mine from such a shop. Makeshift repairs are false economy, as they often result in breakdowns, loss of production, and accidents involving personal injuries; slipshod electrical repairs on underground machines have caused numerous mine explosions and fires. Such a shop as described should constitute an intolerable condition to one who is safety conscious; the response to such a stimulus (situation) would be to clean up immediately and restore order. The question of completing repairs could not enter into the mind of such a man until the shop was in a satisfactory condition; good workmanship could not be reconciled to an untidy shop.

ACCIDENT-PREVENTION PROMOTION

A logical question is - how may good safety habits be encouraged? It is a psychological fact that human beings develop habits to satisfy some urge or desire, although the satisfaction thereof may at times be obscure. The person, himself may not know the exact nature of the satisfaction he derives from a habit, such as biting finger nails; nevertheless, some desire is satisfied.

To promote an accident-prevention program among mine employees, it is necessary that such a program seem desirable to the employees. For example, if a foreman speaks of accident prevention because he wants the mine to have a good safety record, the response may be negative. Some of the employees may harbor a personal dislike for the foreman and feel that a good safety record would be a "feather in the cap" of the foreman; therefore, such employees may be indifferent to the safety program or openly hostile to it.

The most satisfactory method of promoting accident prevention is to personalize the program. Notwithstanding educational efforts in explaining the reasons for certain safety rules and regulations, it has been difficult in some instances to gain compliance. At a certain safety meeting not connected with mining, a speaker described the difficulty his company was having in enforcing some safety rules during the war. This company greatly expanded its shop work and, owing to the manpower shortage, was required to employ a great many women, many of whom were required to work on the second floor. A rule prohibiting "running" was not at all effective when the whistle blew at the end of a shift; the time clock was at one end of the shop and a short passageway with two 45-degree turns led from the clock to a stairway. At the end of each shift, after "punching the clock," there was a mad scramble to get out,

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and in the general pushing and confusion some of the girls had been severely injured, particularly from falls on the stairway. Signs and cartoons depicting this dangerous situation, pleading, and cajoling the workers availed virtually nothing to stop the practice. Finally, when all other efforts had failed, the bad situation was corrected by installing full-length mirrors at each 45-degree turn in the passageway. The person who arrived at this solution was well aware that no woman could pass two full-length mirrors without at least pausing to survey herself.

Another example was related concerning a large number of women in a machine shop. The company had purchased and offered to sell protective caps at cost to the employees. Very few of the girls would wear these caps, perhaps because they felt the caps were unbecoming. Some very bad accidents had occurred, particularly in operating drill presses, in which some of the girls were virtually scalped. These bad accidents were given wide publicity by photographs, safety talks to groups and individuals by the safety director and plant nurse, and bulletins and cartoons were posted in conspicuous places, all to no avail. The hair-entangling accidents continued without abatement. Something had to be done, so the safety director entered into justifiable collusion with the plant nurse, in which the latter initiated a "whispering campaign" intimating that the shop atmosphere contained certain unseen vapors quite deleterious to hair tints and permanent waves and that the protective caps in the company supply room were "just the thing" to safeguard against this contingency. Almost immediately the supply of protective caps was exhausted by the unprecedented demand not only from the shop workers but also by the women employed in an adjoining building.

It is not intended that subterfuge should be resorted to in the promotion of accident-prevention programs. However, sometimes the end may justify the means when all other methods fail.

Human beings require various methods of appeal as all do not react the same way to one particular method of approach. The program must satisfy a human desire or be presented so that it seems personally desirable. Each individual must be studied by his foreman, who should select the proper means of "selling" an accident-prevention program. Persons are encouraged to follow safe work habits by such means as:

1. Fear of injury and the physical pain connected therewith.

2. Love of home and family and the desire to avoid hardship to loved ones.

3. Fear of loss of earning power and economic disaster accompanying injury.

4. Pride in accomplishment - the satisfaction of doing a job well.

5. Loyalty to his foreman and the knowledge that recognition in the form of promotion may result from being a safe worker. This may be termed the urge or desire for personal gain.

6. The spirit of contest - the workman's desire to see his mine outstanding in safety record. This is more often the official's desire or urge rather than the workman's.

7. Encouragement of suggestion - the workman is consulted as to his ideas on safety problems.

The foregoing are examples of how workmen may be appealed to in promoting a safety program. The best safety effort will not emerge from the paper stage unless the persons who must practice the principles are convinced that the program is good and desirable for them and that their adherence to the program is justifiable.

PROCEDURE IN EMPLOYING NEW WORKMEN

At some mines the accident-prevention program "gets off on the wrong foot" with new employees. A man is hired for a job in the mine and is given a physical examination, in many instances, to determine whether he will be a good physical risk for the company. The man knows that the physical examination is not primarily for his benefit. After the hiring routine is completed, the superintendent or mine foreman may ask the man if he is acquainted with the State mining law. The man will probably answer in the affirmative and the questioner, more often than not, will not make an effort to determine whether the man actually does know the law pertaining to his job. If the company has a published booklet of safety rules, the official may give a copy to the man with the admonition that he ought to read it. The man puts the booklet into his pocket and that is often the last thought he gives to it. The foreman next proceeds with the man to the place where he is to work and, with a few perfunctory remarks, the workman is left to his own devices. Such procedure, which is not unusual, is not conducive to developing a safe, efficient workman.

The more acceptable method of developing a safe workman is for the official to explain the State mining law to the workman, at least so far as the law applies to his job. The company safety rules should be explained in a clear-cut, friendly manner, and the reasons for such rules should be given, meanwhile stressing the fact that such laws and rules are for the benefit of the man to a far greater extent than for the company. The official or some good, loyal workman should spend considerable time with the new workman at his working place, and the workman should not be left to his own devices until he has become familiar with his new surroundings. The workman may have had years of experience in his particular work, but there is a strangeness about every new job; the extra time spent with the new employee makes him feel that the company is interested in him. A person usually is interested in those who appear to be interested in him. The psychologists call this "inflating his ego"; it may be called appealing to his vanity. Call it what you will the extra time spent gives the new workman a feeling of importance, and he is more likely to be a safe, efficient workman with the procedure outlined.

PROCEDURE AT SEVERANCE OF EMPLOYMENT

A phase of human relations that many companies disregard is an interview at the termination of employment of a workman. This is often termed a severance or an exit interview. Such an interview should be conducted by a tactful individual, preferably one trained in personnel work and human relations. The purpose of the interview should be to determine, if possible, the true reasons why the man leaves the company's employ, and the questioning, if conducted on a friendly basis, may disclose many facts closely allied with accident prevention and efficient production. In general, the workman's supervisor is not the proper person to conduct the exit interview; many workmen leave a company with some real or imaginary grievance and, in many instances, bad feeling has developed between the foreman and the workman. It would be useless for the foreman to attempt the exit interview because in many instances the workman would refuse to be interviewed. A trained personnel man would have to be alert for "colored testimony," because a disgruntled employee may tend to exaggerate or even make absolutely false statements. On the other hand, the foreman may be "sore" because the man is leaving the mine, and his statements may not be strictly factual. It is therefore important that the interviewer investigates statements affecting the operation and safety of a mine before arriving at any conclusions. Some employees leave a company to accept a better job, for lack of opportunity for advancement, because of transportation difficulties to and from their homes, and for other reasons that cause no resentment or ill feeling between them and the officials; many such employees are reemployed later. Exit interviews with employees who are severing their connections under favorable circumstances or at least "without nursing a grudge" are more likely to give satisfactory results than are those with employees who leave the company's employ under unfavorable circumstances. It is important to know, if possible, why a disgruntled employee has become dissatisfied and, if it is the employer's fault, the situation should be corrected to prevent recurrence.

ENLISTING COOPERATION

The success of an accident-prevention program depends very largely on the degree of cooperation obtained from the employees. The various safety rules and regulations should be explained to the employees. Repetition is usually necessary; it is utilized in virtually all educational processes. Remember how, as a child, you learned the multiplication table; it was by continual drill and repetition. The reasons for the safety rules should be explained to the employees, as they are much more likely to cooperate if they know why they are asked to comply with the rules. Suggestions for improvement in accident-prevention methods should be solicited, because it manifests to the employee that his opinion and judgment are valued; it is one means of acknowledging his intelligence. Safety suggestions by employees should be instituted when they have practical value, and the suggestions adopted should bring some reward or tangible recognition to the employee. Such recognition should be publicized, "giving credit where credit is due," because cooperation in accident prevention is more likely to be gained if the employee is encouraged to feel that he is of some importance to the organization. Without employee cooperation, any accident-prevention program is doomed to failure.

CONCLUSION

The foregoing discussion should illustrate that man is not a machine, and all men do not react uniformly to certain situations. From a psychological point of view, man is a creature of habit and behavior, some of which is predictable and some unpredictable. Furthermore, man is a creature of emotions, such as jealousy, prejudice, hate, love, fear, and he has certain biological urges or desires which circumscribe his actions or behavior. The ultimate goal in accident prevention is to so condition a workman's thinking in an unsafe situation that he is subject to an irresistible force to correct the situation without delay. Above all, the workman must be convinced that an accident-prevention program is worthy of his support and that it will contribute to his life, liberty, and pursuit of happiness.